

collecting device. This device is, for example, a particular management information base (MIB), called an Rmon MIB by one skilled in the art.

Each indicator agent manages a so-called subscriber list on which the names of other indicator agents according to the invention may be written. This list is stored in the storage means of the computer equipment unit associated with the indicator agent, for example in the form of a table (1010, 2010). An indicator agent A1 is written on this list by sending a specific so-called subscription notification "Subscribe (id(A1) Management Information (A1))" to another indicator agent B1, which calculates the indicator (IB1). This notification includes as parameters a piece of so-called management information that allows the sending agent to create an association between a propagation of a value modification and the other indicator agent (B1), and the identifier id(A1). Upon receiving a subscription notification, the destination agent (B1) processes the notification by writing into the subscriber table (2010) the identifier (IdA1) of the sending agent as well as the management information (Management Information (A1)) on the list. This list is consulted by the indicator agent (B1) that manages it, after the evaluation of the indicator (IB1) by the agent (B1). If the new value of the indicator is different from the value previously evaluated and stored by the agent, then the agent sends each agent written on the subscriber list (2010) and identified by the parameter (id(A1)) a value change notification (ValueChanged) comprising the new value (Val(IB1)) of the indicator (IB1). To do this, after the evaluation of the indicator (IB1), a comparison module of the indicator agent (B1) compares the new value of the indicator (Val(IB1)) to the value previously calculated (Valp(IB1)) and stored. If the two values are different, the comparison module activates a procedure for sending the value change notification (ValueChanged) to all of the agents, for example A, written on the subscriber list (2010) then records the new value of the indicator in the storage means of its computer equipment unit. The value change notification comprises as parameters the new value of the indicator (Val(IB1)) and the management information (Management Information (A1)) of the target agent, so that the target agent can assign the value received to the indicator awaited.

According to the invention, the monitored domain constituted by the set of resources (101, 102, 201, 202) is organized into a plurality of subdomains ($d1=\{A1, A2\}$; $d2=\{B1, B2\}$). Each of the subdomains contains either a set of resources to be monitored, and/or a set of subdomains.

A subdomain is also characterized by the indicator agents running in the resources constituting the subdomain. For each subdomain, a set of agents called "synthesis agents" is

installed in a particular resource so as to constitute a synthesis node. This resource can be a dedicated monitoring resource or a general-purpose resource chosen because of its technical characteristics to support the synthesis node. Moreover, this resource could also be a given resource of the subdomain or of another subdomain. In fact, one resource can support the monitoring of several subdomains, for example ranging from 0 to n, if this resource is capable of handling the load produced by the calculations performed by a plurality of sets of synthesis agents.

Basically, the structure of a synthesis agent is identical to that of an indicator agent; the difference in terms of behavior and utilization lies mainly in the formula representing the indicator to be evaluated.

During the configuration of the monitoring of the monitored domain according to the invention, a naming service is used to define and maintain the associations between the name of the subdomain and the identification of the indicator agent responsible for evaluating an indicator of the subdomain.

In other words, the naming service (SN) supplies, for each subdomain, all of the indicator agents present in this subdomain and associates, for example in a table (4) or in an association file, each indicator agent (AI) with the indicator (Ia1) it calculates and with the subdomain (d1) to which it belongs. This naming service SN is then used during the configuration of each synthesis agent. This naming service can be either centralized or distributed. When the naming service is centralized, as represented in Fig. 1, the information relative to the association between a subdomain and an indicator agent is centralized in a single place in the monitored domain represented, for example, by a resource of the monitored domain.

When the naming service is distributed, the naming service associated with each agent machine has the names of the agents it manages, as well as the subdomain to which each agent belongs.

The agent machine manages a certain number of properties, i.e. the atomic aspect of an agent's reaction to a notification and the delivery of the notifications in a causal sending order.

The agent machine handles the distribution of the notifications, the transmission of the notifications and the management of the overall atomicity. The agent machine comprises various entities such as an execution engine and a communication channel, this channel having two queues, a local queue and an external queue.

The agent machine is distributed. The agent machines communicate with each other; the agents do not see this distribution since they communicate through notifications and address their local agent machine. An agent's reaction is always local.

The centralized or distributed naming service SN is necessary for the configuration of the synthesis agents (As). In essence, as a general rule, a synthesis agent is designed to evaluate an indicator whose formula includes at least one set-oriented operator such as a sum, an average, or the determination of a minimum or a maximum in one or more indicators of the subdomain with which the synthesis agent is associated. However, a synthesis agent can also evaluate an indicator representing the general operation of the subdomain with which it is associated.

Thus, the configuration of a synthesis agent requires the latter to subscribe to all the indicator agents of the subdomain monitored by the synthesis agent that evaluate the indicator or indicators contained in the formula of the indicator of the synthesis agent. To do this, the synthesis agent (As) sends the naming service (SN), for each indicator required for the evaluation of its own indicator, a notification requesting an indicator lookup (indicatorLookupReq) that specifies the name of the subdomain (d1) that the synthesis agent (As) monitors, as well as the names of the indicators required for the evaluation of its own indicator. In response to this notification, the naming service performs a search in order to find the names of all the agents that perform the evaluation of the requested indicator in the subdomain specified in the notification. The naming service constructs and then sends a response notification (indicatorLookupResp) to the requesting synthesis agent containing the name of the domain (d1) and the name of the indicator agent or agents (A1, A2), if they exist. This response notification is processed by the synthesis agent, which extracts the names of the indicator agents and activates, for each indicator agent extracted, the subscription procedure described above.

In a variant of embodiment, when no indicator agent corresponding to the subdomain name/indicator name association exists, the naming service can include means for storing the name of the synthesis agent that sent the notification and the name of the indicator requested. Thus, as soon as a new indicator agent is installed in the subdomain, it is detected by the detection means of the naming service (SN) or is declared to the latter by the installer. The naming service includes means for performing an update of the subdomain name/indicator name associations and for verifying whether the name of the indicator corresponds to a stored indicator name. If so, means in the naming service construct, then send, the response